October 6, 2014

ETA – Goldman Sachs Merchant Acquirer and ISO Survey – Fall 2014

Equity Research

Pricing dynamics, mobile payments, iPOS, and EMV are key themes

ETA – Goldman Sachs Merchant Acquirer and ISO Survey

This report presents key findings from the Electronic Transactions Association-Goldman Sachs (ETA-GS) Merchant Acquirer & ISO Survey – Fall 2014, which collected insights from 53 merchant acquirers and ISOs of all sizes across the United States on emerging payments trends.

Business trends: Volumes improving; price pressure remains

60% of respondents expect consumer payment volumes to grow at an accelerated rate in 2H14 vs. 1H14, with just 4% citing decelerating volume trends. However, respondents noted an average decline in the industry merchant discount rate by 5-15 bps since our January 2013 survey, with the largest degradation among merchants with $50k-$100k in volume. Most frequently cited drivers of lost business were larger merchant acquirers and ISOs, followed by new entrants (Amazon, Intuit, etc.) & iPOS vendors.

Mobile: NFC emerges the winner, but expect slow adoption

Post the announcement of Apple Pay, a majority of respondents cited NFC as the technology of choice for enabling mobile payments by smartphone or tablet. However, merchant acquirers and ISOs expect the pace of mobile payment adoption by consumers to be slow, with the average of respondents expecting just 20% volume penetration after 3.5 years. Merchant acquirers/ISOs remain uncertain as to whether they view new entrants (Apple and Amazon) as potential partners, competitors, or both.

Integrated payments: Penetration is mixed, but accelerating

Our survey noted mixed trends regarding the adoption of integrated payments (iPOS) technology, with 40% of respondents having 10% or less of their merchants on iPOS solutions today, but 28% of respondents stated that over 25% of their merchant base currently uses iPOS. The data also suggest a gap between penetration rates of iPOS for different verticals, with hospitality and specialty retail having the highest penetration.

EMV: Expected to reach 45% adoption in the US exiting 2015

A significant gap exists among merchant acquirers expecting higher vs. lower levels of EMV adoption among merchants, which we believe may be due to their exposure to merchants of different sizes. An average of responses suggests penetration at 45% of merchant locations exiting 2015.

Bitcoin: Incremental traction, but skepticism remains

2% of respondents accept Bitcoin today, and 13% plan to accept it in the next year (from 2% in March 2014) – although many see barriers to adoption.

James Schneider, Ph.D.
(917) 343-3149 james.schneider@gs.com
Goldman, Sachs & Co.

S.K.Prasad Borra
(917) 343-7293 skprasad.borra@gs.com
Goldman, Sachs & Co.

Margarite Halaris
(801) 741-5443 margarite.halaris@gs.com
Goldman, Sachs & Co.

Jordan Fox
(917) 343-9157 jordan.fox@gs.com
Goldman, Sachs & Co.

Jeffrey Chen
(917) 343-2456 jeffrey.j.chen@gs.com
Goldman, Sachs & Co.

Contents

Pricing dynamics, mobile payments, iPOS, EMV are key themes

This report presents key findings from the Fall 2014 Electronic Transactions Association – Goldman Sachs (ETA-GS) Merchant Acquirer and ISO Survey, which asked merchant acquirers and independent sales organizations (ISOs) for their insights on key trends in payments.

We collected 53 survey responses from merchant acquirers and ISOs of various sizes and across the United States. The survey addressed industry volume, pricing, and attrition rates, trends in the adoption of integrated payments, the expected penetration of mobile payments, the pace of EMV adoption, and expectations for digital currencies.

Key findings from our survey include: (1) Payments volume growth is improving, but pricing remains under pressure with lost business being attributed to a mix of larger acquirers/ISOs, new entrants like Amazon/Intuit, and integrated payments resellers and distributors; (2) There appears to be an uptick in expectations for near-field communications (NFC) as the mobile payment technology of choice post the launch of Apple Pay, although most participants expect only 20% of payment volume to be mobile within 3.5 years; (3) Integrated payments technology solutions are seeing more rapid adoption, but penetration varies widely by industry vertical; (4) EMV terminal adoption among merchants appears somewhat accelerated vs. prior expectations, with about 45% of merchant locations expected to be enabled by the end of 2015; and (5) Digital currencies like Bitcoin are gradually gaining mindshare among merchant acquirers and ISOs, but many remain skeptical (in part due to regulatory and other factors).

Who is the Electronic Transactions Association?

The Electronics Transactions Association (ETA) is the leading international trade association for the electronic transaction processing community. The ETA has over 500 member companies worldwide, including leading financial institutions, transaction processors, ISOs and equipment suppliers.

Why did we survey merchant acquirers and ISOs?

Merchant acquirers and ISOs play a critical role in electronic transactions as they enable merchant adoption of electronic payment methods. On a daily basis, they actively engage merchants on various payments topics – and they are responsible for negotiating the price to merchants for accepting electronic payments (the merchant discount rate, or MDR). Given their merchant relationships, acquirers and ISOs also serve as a distribution channel to retailers, including point of sale (POS) vendors and providers of loyalty solutions. Although large retailers have substantial bargaining power and often make payments-related decisions unilaterally, merchant acquirers and ISOs can play an influential role with small- and medium-size (SME) merchants.

A word on comparisons

Throughout this report we compare results from the current survey with results from our prior surveys (see our March 2014 and January 2013 publications: *ETA-GS Merchant Acquirer & ISO Survey*). We make these comparisons for illustrative purposes, highlighting when sentiment on a particular topic shifts significantly. However because responses are anonymous, we cannot ensure whether respondents remain the same across multiple surveys.

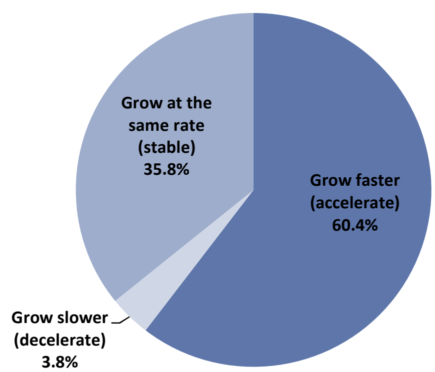
General industry trends: Volumes accelerating, but pricing remains a headwind

Most respondents in our survey remain constructive on the prospects for accelerating payment volume growth in 2H 2014. However, as has been the case for several surveys, pricing pressure continues to be an ongoing trend in the SME merchant acquiring space. Regarding attrition, larger acquirers/ISOs, new entrants in the payments market (including Amazon, Intuit, etc.), and integrated payments distributors/resellers were cited as having gained share.

Volume trends: Most expect accelerating growth in 2H 2014

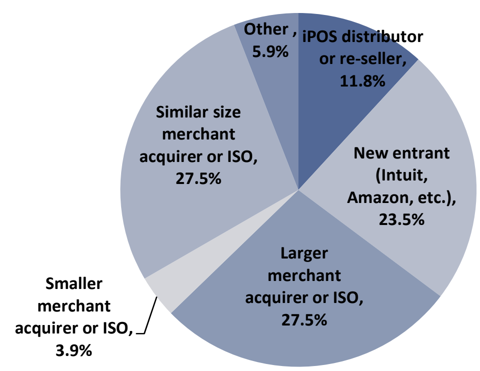
Our survey suggests that payment volume trends in the United States are likely to accelerate in 2H 2014, which is consistent with our own analysis of retail data in the United States. 60% of respondents in our survey expect industry volume growth to grow at a faster rate than last year (accelerate), 36% expect volume growth to remain constant (stable), and just 4% expect volume growth to decline or decelerate (Exhibit 1).

Exhibit 1: Based on your in-house views of the domestic/global economy, do you expect electronic payment growth to grow faster, to decelerate, or remain stable relative to first half of 2014?
60% of respondents expect payment volume to accelerate



Source: ETA, Goldman Sachs Global Investment Research.

Exhibit 2: Regarding merchant attrition, to whom do you believe you have lost more business over the past 12 months?
Most respondents see merchant acquirers/ISOs of similar or larger size and new entrants as responsible for lost business



Source: ETA, Goldman Sachs Global Investment Research.

Attrition: Share gains for larger traditional players, new entrants, iPOS vendors

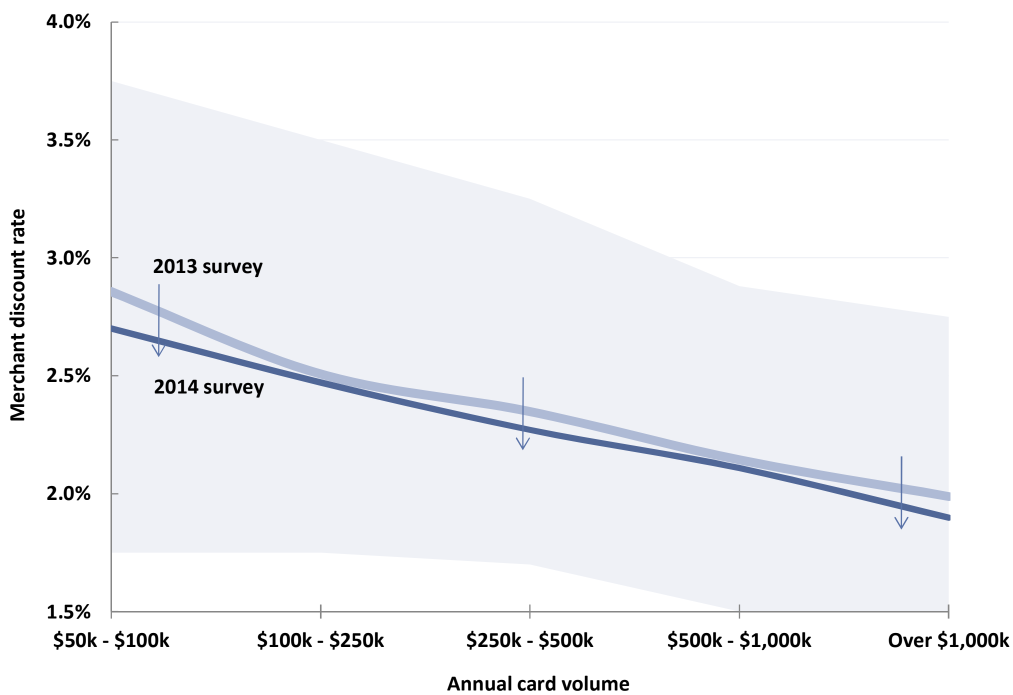
In terms of sources of incremental attrition (lost business) for merchant acquirers/ISOs responding to our survey, results were fairly evenly split. Roughly 55% of respondents surveyed see most business lost to traditional merchant acquirers or ISOs of similar or larger scale – which suggests to us that larger merchant acquirers may be using their scale advantage to compete more aggressively on price (see also our March 12, 2014 note, *ETA-GS Merchant Acquirer and ISO Survey*). New entrants in the market (Amazon, Intuit, and others) were cited by 24% of respondents as the main drivers of attrition, and iPOS distributors/resellers were cited by 12% of respondents (Exhibit 2).

Pricing pressure remains a challenge

Consistent with our last survey, we believe pricing pressure remains a headwind for merchant acquirers and ISOs, particularly in the SME space. As part of this survey, we asked a series of quantitative questions on expectations for merchant discount rates across the industry, based on different levels of merchant purchase volume. We then compared the results of our latest survey with our last quantitative pricing survey 18 months ago

(January 2013) to better quantify the level of pricing compression over that timeframe (Exhibit 3). Overall, our survey indicates that on average, merchant acquirers/ISOs have seen between 5 bps and 15 bps of pricing compression (in the merchant discount rate, or MDR) over the past 18 months. We noted the largest pricing compression for merchants between $50k and $100k of purchase volume (about 15 bps), which we believe is consistent with responses to other questions which suggest some level of market traction for new market participants (such as Amazon, Intuit, etc.) with more aggressive merchant pricing structures targeting SME merchants. Somewhat more surprisingly, we noted approximately 10 bps of average pricing compression for larger merchants (over $1 mn in volume). We view increasing competition in the merchant acquirer space, particularly from larger merchant acquirers moving down market as well as from iPOS distributors/resellers, as a fundamental driver of this trend.

Exhibit 3: For the industry, what do you believe is the average merchant discount rate?
Respondents noted pricing compression of 5-15 bps in most volume categories



Source: ETA, Goldman Sachs Global Investment Research.

Integrated payments (iPOS) adoption continues to accelerate

As we highlight in our sector launch report (*Resume on Payments: Cashless destiny is ahead, with a few minor bumps,* July 8, 2014), we believe merchant acquirers will increasingly seek to embrace integrated payment technologies in order to drive a "stickier" base of merchant business. As noted in our survey, more merchant acquirers have begun to offer integrated POS solutions, and we expect this to remain a significant industry theme in the medium term.

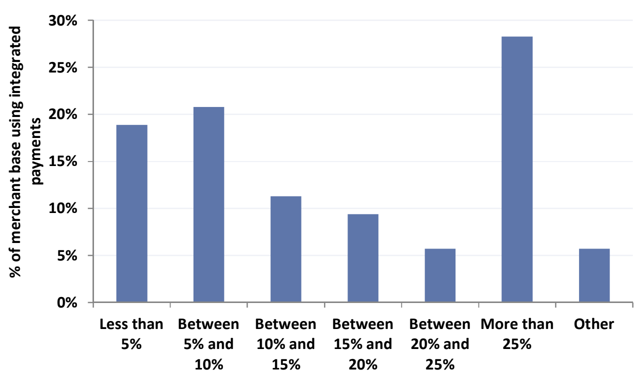
Adoption of integrated payments (iPOS) still in early stages but has accelerated…
In terms of the penetration of integrated payments technology, our survey noted a significant bifurcation – with most acquirers/ISOs citing low iPOS penetration among their merchant base, but a significant fraction noting much higher penetration (Exhibit 4). Note

that our definition of iPOS (integrated point of sale systems) includes tablet-based registers, smartphone-based card readers, and custom PC-based payment systems. A full 40% of respondents indicated that 10% or fewer of their merchants are using iPOS solutions today, with 25% of respondents suggesting that penetration of iPOS has reached 10%-25% of their merchant base. However, we find it notable that 28% of respondents stated that over 25% of their merchant base is currently enabled with an iPOS solution. Relative to our own industry estimate that suggests about 15% of the total merchant base in the United States is currently enabled with iPOS systems, this data suggests that some merchant acquirers and ISOs are either meaningfully ahead of or behind the pace of the overall industry with respect to adoption.

...and is concentrated among certain industry verticals

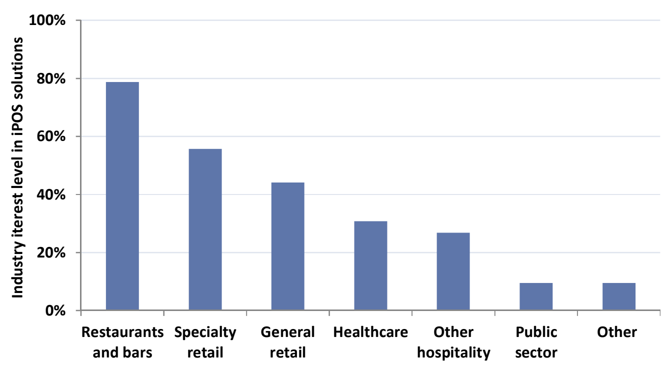
Our survey suggests that demand among merchants for integrated payment technology differs greatly among industry verticals. Nearly 80% of respondents cited high demand for iPOS solutions among restaurants and bars, with 55% and 45% citing specialty and general retail (respectively), 30% citing healthcare and 28% citing other hospitality (Exhibit 5). In large part, we believe this trend reflects the large number of vertical-specific POS solutions developed for these industries – and we would expect to see continued focus on more vertical-specific solutions as iPOS demand accelerates throughout the industry (Exhibits 4-5).

Exhibit 4: What percentage of your merchant base is currently using integrated payment technology?
Respondents noted a significant split in iPOS penetration rates



Source: ETA, Goldman Sachs Global Investment Research.

Exhibit 5: Based on your interactions with merchants, which industry verticals are most interested in iPOS solutions?
Many acquirers highlighted iPOS demand in hospitality and specialty retail (note that multiple answers were accepted)



Source: ETA, Goldman Sachs Global Investment Research.

Mobile payments and new entrants: NFC emerges as the clear winner, although most expect slow adoption

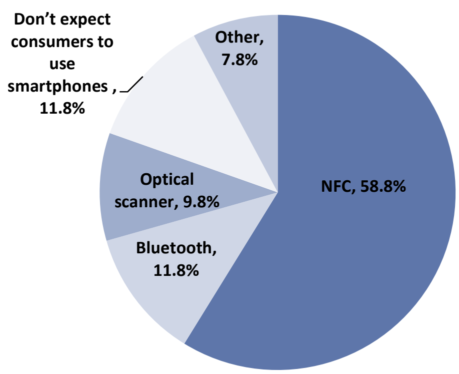
Following the launch of Apple Pay on September 9, we believe the industry remains focused on the potential adoption rate of mobile payments (both in e-commerce and at brick-and-mortar retailers) in the coming years. We think our latest survey reflects the significant uncertainty confronting many merchant acquirers and ISOs regarding the potential for either partnerships or increased competition from new entrants on the payments landscape including Apple, Google, and Amazon – with very little consensus on how these trends will play out at this stage.

General consensus exists on mobile technology and gradual pace of adoption...

Although our past surveys had noted significant uncertainty among respondents on potential technology solutions for mobile payments, most respondents (59%, Exhibit 6) cited NFC as the mobile payment technology of choice post the launch of Apple Pay (which uses NFC). We view this relative consensus surrounding NFC as a technology solution of choice for mobile payments as notable. However, most merchant acquirers and ISOs believe the adoption of mobile payment technology among consumers is likely to be gradual. When asked to estimate the timeframe during which 20% of consumer transactions will be made with a smartphone or tablet, only 15% of respondents expect this to occur within two years (Exhibit 7). Taking a weighted average timeframe, our respondents believe that it will take approximately 3.5 years to reach just 20% of total consumer payment volume processed on mobile.

Exhibit 6: What mobile technology do you think is most likely to be eventually adopted by consumers to pay in merchant locations?

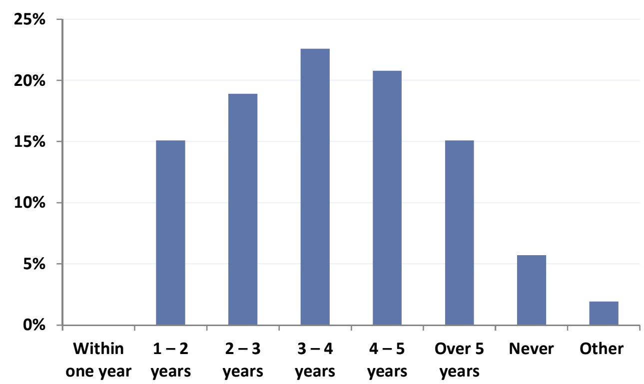
NFC is now seen as an incumbent technology for mobile



Source: ETA, Goldman Sachs Global Investment Research.

Exhibit 7: In what timeframe do you expect 20% or more of consumer transactions will be made by consumers paying with their smartphones?

The median timeframe cited by respondents is 3.5 years

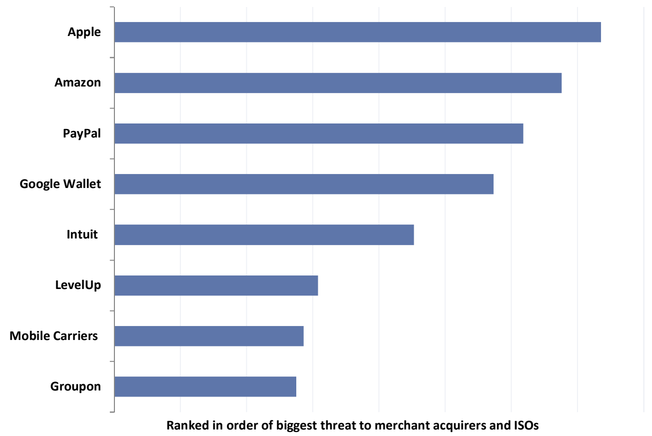


Source: ETA, Goldman Sachs Global Investment Research.

...but significant uncertainty on the potential role of new entrants

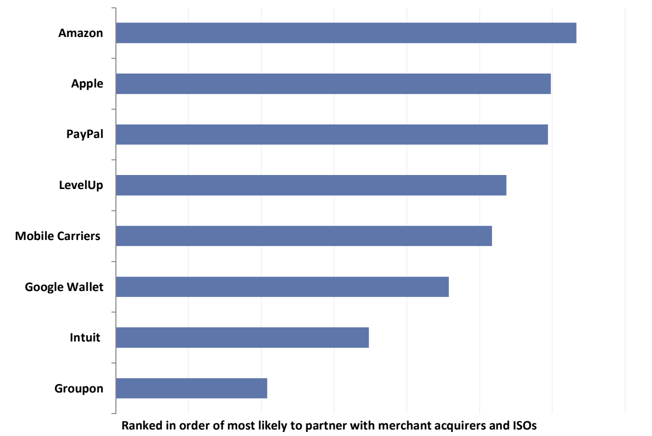
Relative to past surveys, there has been little change with respect to how new entrants – including Apple, Amazon, PayPal, and Google – are viewed by merchant acquirers and ISOs. We asked survey participants to rank new entrants in the payments landscape as potential threats (Exhibit 8) and potential partners (Exhibit 9). Notably, Apple, Amazon, and PayPal were cited as both the top three potential threats and partners among respondents. Even following the launch of Apple Pay (which we believe generally reinforces the existing structure and economics of incumbent players), many merchant acquirers and ISOs still cite Apple as a significant threat – which suggests to us that many industry participants believe that Apple's intentions or business model in payments could change over time.

Exhibit 8: Which of the following do you view as the biggest potential threat to merchant acquirers and ISOs?
Apple, Amazon and PayPal are seen as primary threats



Source: ETA, Goldman Sachs Global Investment Research.

Exhibit 9: Which of the following do you view as the most likely partner for merchant acquirers and ISOs?
Apple, Amazon and PayPal are also seen as potential partners

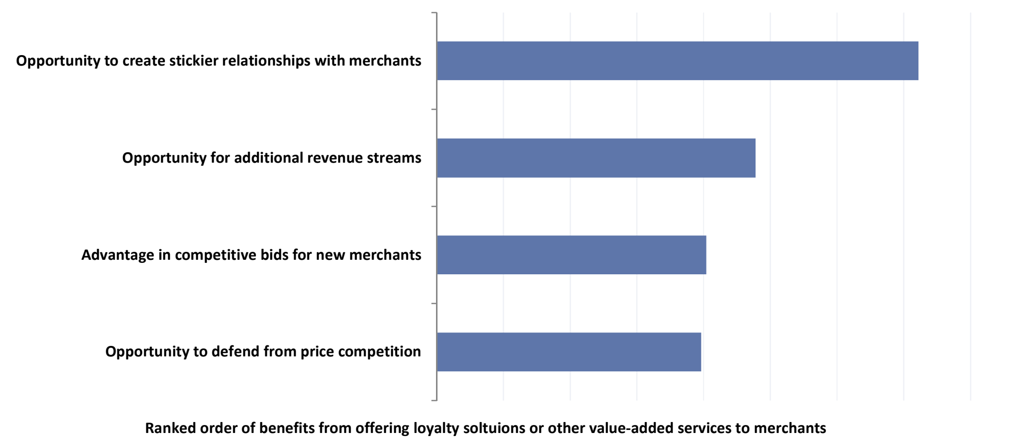


Source: ETA, Goldman Sachs Global Investment Research.

Loyalty and analytics solutions viewed as driving "stickier" merchant business

New customer loyalty and analytics solutions have long been viewed as ways for merchant acquirers and ISOs to enhance the "stickiness" of existing merchant business, and to provide supplemental revenue streams for traditional processing business. Most respondents in our survey cited loyalty and analytics solutions as providing the ability to help drive lower merchant attrition, defend from price competition, or differentiate in competitive bids. But a significant number also suggested that they view loyalty and analytics solutions as an incremental revenue source (Exhibit 10).

Exhibit 10: How would you rank order the benefits you expect to see from offering loyalty and other valued-added services?
Most respondents see the potential to create stickier merchant business



Source: ETA, Goldman Sachs Global Investment Research.

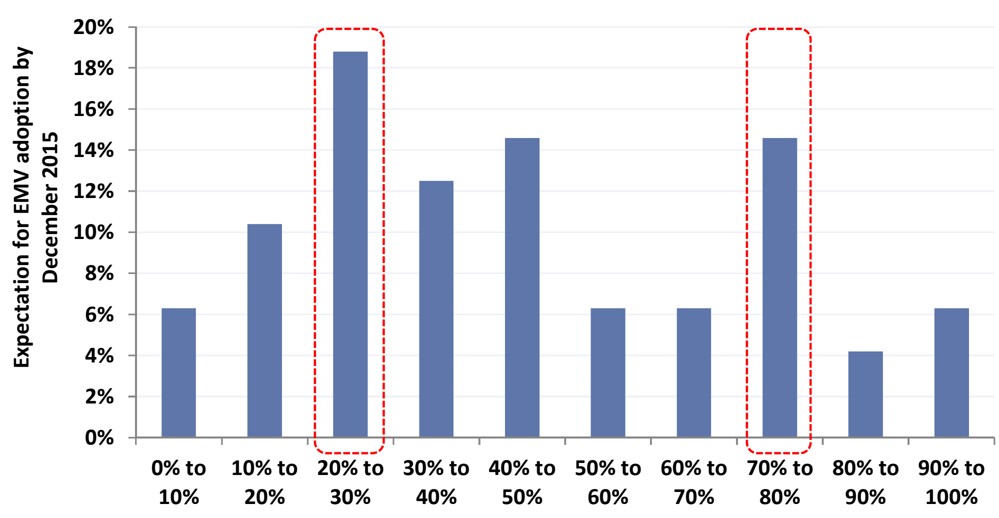
EMV: Expected to reach 45% adoption in the US exiting 2015

Following a series of high-profile merchant data breaches in 2013, cybersecurity has become a prominent topic in the payments industry. Our latest survey has expanded its emphasis on EMV adoption trends in the industry to get a more granular view ahead of the upcoming merchant liability shift in October 2015. The results of our analysis suggest that EMV terminal adoption among merchants is likely to be split among large national merchants and SME merchants – with slower adoption likely for smaller merchants. Despite this, taking a weighted average of responses suggests that up to 45% of merchant terminals in the United States could be upgraded to EMV by the end of 2015.

EMV adoption likely to be split between large and small merchants

Our survey attempted to gauge the level of EMV terminal adoption among merchants that is likely to occur ahead of the October 2015 liability shift. Respondents noted a wide range of expectations in terms of the percentage of merchant locations they expect to be enabled with EMV terminals by the end of 2015 (Exhibit 11). Of note, there were two clusters of respondents – one centered around 20%-30% adoption, and one centered around 70%-80% adoption. We believe this split may be due to the difference in mix between larger and smaller merchants for acquirers and ISOs participating in our survey. A weighted average of respondents would suggest that approximately 45% of US merchant locations are expected to upgrade to EMV by the end of 2015 – which compares somewhat favorably to our existing industry estimate of roughly 40% in our July 2014 industry launch report.

Exhibit 11: Approximately what percentage of merchant locations do you expect to upgrade to EMV by December 2015?
Weighted average suggests about 45% EMV penetration of US merchants exiting 2015

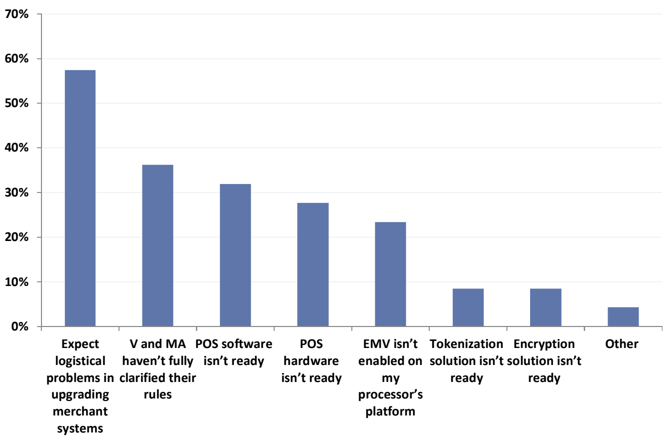


Source: ETA, Goldman Sachs Global Investment Research.

Cost is the main impediment to EMV adoption; some logistical issues expected

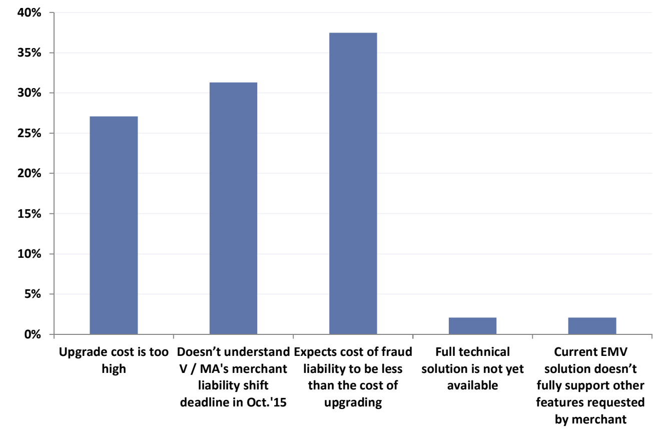
Our survey also explored the potential impediments to EMV adoption by merchants, and what logistical difficulties might be encountered in the upgrade process. Nearly 63% of respondents cited cost (either absolute investment required, or upgrade cost relative to the cost of fraud liability) as the major impediment to EMV adoption by merchants (Exhibit 13). We also note that many respondents pointed to potential difficulties related to the upgrade process, including logistical problems in merchant systems upgrade, clarity on Visa and MasterCard's EMV rules, and challenges to POS hardware/software readiness (Exhibit 12).

Exhibit 12: Do you see any significant technical or logistical barriers to enabling merchants to be fully ready to process transactions with EMV by 2015?
Logistics, network rules, and POS readiness are challenges (multiple answers accepted)



Source: ETA, Goldman Sachs Global Investment Research.

Exhibit 13: If you believe some merchants may delay upgrading to EMV-compatible POS hardware, what do you expect to be the main reason?
Cost remains the most significant factor for merchants



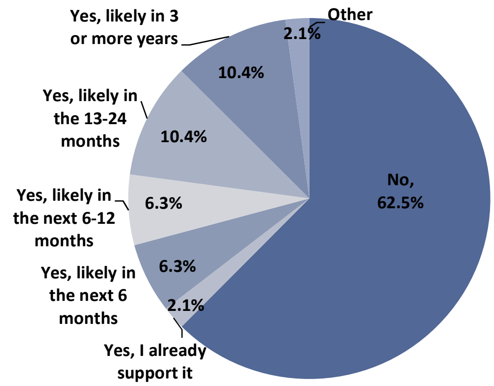
Source: ETA, Goldman Sachs Global Investment Research.

Digital currencies: Incremental traction on acceptance, though skepticism remains

The integration of digital currencies (such as Bitcoin) into the traditional payment ecosystem remains in its earliest stages. In the merchant acquiring space, our survey noted somewhat increased expectations around acceptance for digital currencies – although many respondents noted that significant challenges remain.

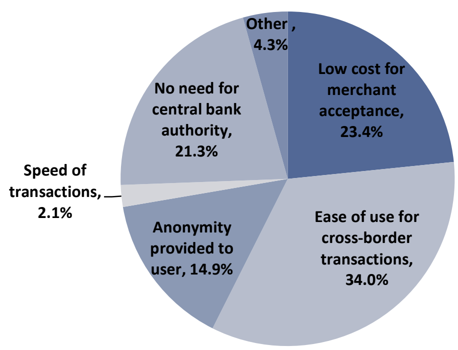
Expectations for Bitcoin acceptance have increased since our March 2014 survey
Although only 2% of merchant acquirers and ISOs surveyed accept Bitcoin today (up from nil in our March 2014 survey), we would point out that 13% now expect to enable Bitcoin acceptance in the next year (up from 2% previously, Exhibit 14). In terms of the most attractive features of digital currencies from an acquirer/ISO perspective, the most common reason cited was ease of cross-border transactions (34%), with low cost of merchant acceptance (23%) and lack of need for banking oversight (21%) also cited as reasons (Exhibit 15). When asked about the biggest impediment they see to the acceptance of Bitcoin, most respondents cited lack of regulation or central bank oversight – with a significant number also citing lack of value proposition as the primary reason (Exhibit 16).

Exhibit 14: Do you plan to enable acceptance of Bitcoin for your merchants?
A majority of respondents have no plans, but adopters have increased from our last survey



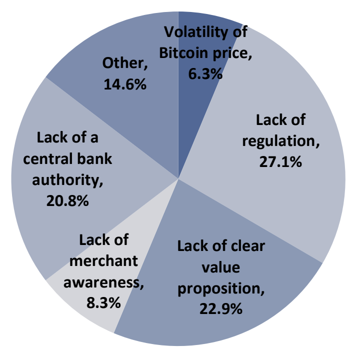
Source: ETA, Goldman Sachs Global Investment Research.

Exhibit 15: What do you view as the most attractive feature of digital currencies?
Cross-border transactions and low merchant costs were cited as drivers



Source: ETA, Goldman Sachs Global Investment Research.

Exhibit 16: What is the biggest obstacle to mass adoption of digital currencies?
Regulatory concerns remain among the barriers to adoption



Source: ETA, Goldman Sachs Global Investment Research.

Respondent overview

This report presents key findings from the Electronic Transaction Association – Goldman Sachs (ETA-GS) Merchant Acquirer & ISO Survey – Fall 2014, which asked merchant acquirers, ISOs, and other industry participants for their insights on key trends in payments. Our survey collected responses from 53 merchant acquirers and ISOs of all sizes across the United States, reflecting the following demographics (Exhibit 17):

Exhibit 17: Merchant acquirer/ISO respondent demographics

By Company Type		By Title		By Active Merchant Outlets		By Price Controlled Merchants		By Share of Bundled Pricing	
Merchant acquirer	26.7%	C-level executive	60.8%	Under 10K	56.8%	0-25%	15.6%	0 - 25%	64.4%
Independent Sales Organization (ISO)	44.4%	Marketing	4.4%	10K- 100K	22.7%	26%-50%	11.1%	26% - 50%	11.1%
Super ISO	11.1%	Sales	19.5%	101K-250K	4.5%	51%-75%	6.7%	51% - 75%	17.8%
Value Added Reseller (VAR)	8.9%	Other	15.2%	Over 250K	15.9%	76%-100%	66.7%	76% - 100%	6.7%
Other	8.9%								

Source: ETA, Goldman Sachs Global Investment Research.

Disclosure Appendix

Reg AC

We, James Schneider, Ph.D., S.K.Prasad Borra, Margarite Halaris, Jordan Fox and Jeffrey Chen, hereby certify that all of the views expressed in this report accurately reflect our personal views about the subject company or companies and its or their securities. We also certify that no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

Investment Profile

The Goldman Sachs Investment Profile provides investment context for a security by comparing key attributes of that security to its peer group and market. The four key attributes depicted are: growth, returns, multiple and volatility. Growth, returns and multiple are indexed based on composites of several methodologies to determine the stocks percentile ranking within the region's coverage universe.

The precise calculation of each metric may vary depending on the fiscal year, industry and region but the standard approach is as follows:

Growth is a composite of next year's estimate over current year's estimate, e.g. EPS, EBITDA, Revenue. **Return** is a year one prospective aggregate of various return on capital measures, e.g. CROCI, ROACE, and ROE. **Multiple** is a composite of one-year forward valuation ratios, e.g. P/E, dividend yield, EV/FCF, EV/EBITDA, EV/DACF, Price/Book. **Volatility** is measured as trailing twelve-month volatility adjusted for dividends.

Quantum

Quantum is Goldman Sachs' proprietary database providing access to detailed financial statement histories, forecasts and ratios. It can be used for in-depth analysis of a single company, or to make comparisons between companies in different sectors and markets.

GS SUSTAIN

GS SUSTAIN is a global investment strategy aimed at long-term, long-only performance with a low turnover of ideas. The GS SUSTAIN focus list includes leaders our analysis shows to be well positioned to deliver long term outperformance through sustained competitive advantage and superior returns on capital relative to their global industry peers. Leaders are identified based on quantifiable analysis of three aspects of corporate performance: cash return on cash invested, industry positioning and management quality (the effectiveness of companies' management of the environmental, social and governance issues facing their industry).

Disclosures

Coverage group(s) of stocks by primary analyst(s)

James Schneider, Ph.D.: America-IT Consulting and Outsourcing, America-Transaction Processors. S.K.Prasad Borra: America-ATM/POS and Self-Service, America-IT Consulting and Outsourcing, America-Transaction Processors.

America-ATM/POS and Self-Service: NCR Corp., VeriFone Systems, Inc..

America-IT Consulting and Outsourcing: Accenture Plc, Amdocs Limited, CGI Group Inc., CGI Group Inc. (US), Cognizant Technology Solutions Corporation, Computer Sciences Corporation, ExlService Holdings, Inc., Fidelity National Information Services, Inc, Fiserv, Inc., Genpact Limited, Performant Financial Corporation, Sabre Corporation, West Corporation, WNS (Holdings) Limited.

America-Transaction Processors: Automatic Data Processing Inc., Blackhawk Network Holdings. Inc., Evertec Inc., FleetCor Technologies, Inc., Global Payments Inc., Heartland Payment Systems, Inc., Mastercard Inc., Paychex, Inc., Total System Services, Inc., Vantiv, Inc., Visa Inc., Western Union Co., WEX Inc..

Company-specific regulatory disclosures

Compendium report: please see disclosures at http://www.gs.com/research/hedge.html. Disclosures applicable to the companies included in this compendium can be found in the latest relevant published research

Distribution of ratings/investment banking relationships

Goldman Sachs Investment Research global coverage universe

	Rating Distribution			Investment Banking Relationships		
	Buy	Hold	Sell	Buy	Hold	Sell
Global	32%	54%	14%	42%	36%	30%

As of July 1, 2014, Goldman Sachs Global Investment Research had investment ratings on 3,697 equity securities. Goldman Sachs assigns stocks as Buys and Sells on various regional Investment Lists; stocks not so assigned are deemed Neutral. Such assignments equate to Buy, Hold and Sell for the purposes of the above disclosure required by NASD/NYSE rules. See 'Ratings, Coverage groups and views and related definitions' below.

Price target and rating history chart(s)

Compendium report: please see disclosures at http://www.gs.com/research/hedge.html. Disclosures applicable to the companies included in this compendium can be found in the latest relevant published research

Regulatory disclosures

Disclosures required by United States laws and regulations

See company-specific regulatory disclosures above for any of the following disclosures required as to companies referred to in this report: manager or co-manager in a pending transaction; 1% or other ownership; compensation for certain services; types of client relationships; managed/co-managed public offerings in prior periods; directorships; for equity securities, market making and/or specialist role. Goldman Sachs usually makes a market in fixed income securities of issuers discussed in this report and usually deals as a principal in these securities.

The following are additional required disclosures: **Ownership and material conflicts of interest:** Goldman Sachs policy prohibits its analysts, professionals reporting to analysts and members of their households from owning securities of any company in the analyst's area of coverage. **Analyst compensation:** Analysts are paid in part based on the profitability of Goldman Sachs, which includes investment banking revenues. **Analyst as officer or director:** Goldman Sachs policy prohibits its analysts, persons reporting to analysts or members of their households from serving as an officer, director, advisory board member or employee of any company in the analyst's area of coverage. **Non-U.S. Analysts:** Non-U.S. analysts may not be associated persons of Goldman, Sachs & Co. and therefore may not be subject to NASD Rule 2711/NYSE Rules 472 restrictions on communications with subject company, public appearances and trading securities held by the analysts.

Distribution of ratings: See the distribution of ratings disclosure above. **Price chart:** See the price chart, with changes of ratings and price targets in prior periods, above, or, if electronic format or if with respect to multiple companies which are the subject of this report, on the Goldman Sachs website at http://www.gs.com/research/hedge.html.

Additional disclosures required under the laws and regulations of jurisdictions other than the United States

The following disclosures are those required by the jurisdiction indicated, except to the extent already made above pursuant to United States laws and regulations. **Australia:** Goldman Sachs Australia Pty Ltd and its affiliates are not authorised deposit-taking institutions (as that term is defined in the Banking Act 1959 (Cth)) in Australia and do not provide banking services, nor carry on a banking business, in Australia. This research, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act, unless otherwise agreed by Goldman Sachs. In producing research reports, members of the Global Investment Research Division of Goldman Sachs Australia may attend site visits and other meetings hosted by the issuers the subject of its research reports. In some instances the costs of such site visits or meetings may be met in part or in whole by the issuers concerned if Goldman Sachs Australia considers it is appropriate and reasonable in the specific circumstances relating to the site visit or meeting. **Brazil:** Disclosure information in relation to CVM Instruction 483 is available at http://www.gs.com/worldwide/brazil/area/gir/index.html. Where applicable, the Brazil-registered analyst primarily responsible for the content of this research report, as defined in Article 16 of CVM Instruction 483, is the first author named at the beginning of this report, unless indicated otherwise at the end of the text. **Canada:** Goldman Sachs Canada Inc. is an affiliate of The Goldman Sachs Group Inc. and therefore is included in the company specific disclosures relating to Goldman Sachs (as defined above). Goldman Sachs Canada Inc. has approved of, and agreed to take responsibility for, this research report in Canada if and to the extent that Goldman Sachs Canada Inc. disseminates this research report to its clients. **Hong Kong:** Further information on the securities of covered companies referred to in this research may be obtained on request from Goldman Sachs (Asia) L.L.C. **India:** Further information on the subject company or companies referred to in this research may be obtained from Goldman Sachs (India) Securities Private Limited. **Japan:** See below. **Korea:** Further information on the subject company or companies referred to in this research may be obtained from Goldman Sachs (Asia) L.L.C., Seoul Branch. **New Zealand:** Goldman Sachs New Zealand Limited and its affiliates are neither "registered banks" nor "deposit takers" (as defined in the Reserve Bank of New Zealand Act 1989) in New Zealand. This research, and any access to it, is intended for "wholesale clients" (as defined in the Financial Advisers Act 2008) unless otherwise agreed by Goldman Sachs. **Russia:** Research reports distributed in the Russian Federation are not advertising as defined in the Russian legislation, but are information and analysis not having product promotion as their main purpose and do not provide appraisal within the meaning of the Russian legislation on appraisal activity. **Singapore:** Further information on the covered companies referred to in this research may be obtained from Goldman Sachs (Singapore) Pte. (Company Number: 198602165W). **Taiwan:** This material is for reference only and must not be reprinted without permission. Investors should carefully consider their own investment risk. Investment results are the responsibility of the individual investor. **United Kingdom:** Persons who would be categorized as retail clients in the United Kingdom, as such term is defined in the rules of the Financial Conduct Authority, should read this research in conjunction with prior Goldman Sachs research on the covered companies referred to herein and should refer to the risk warnings that have been sent to them by Goldman Sachs International. A copy of these risks warnings, and a glossary of certain financial terms used in this report, are available from Goldman Sachs International on request.

European Union: Disclosure information in relation to Article 4 (1) (d) and Article 6 (2) of the European Commission Directive 2003/126/EC is available at http://www.gs.com/disclosures/europeanpolicy.html which states the European Policy for Managing Conflicts of Interest in Connection with Investment Research.

Japan: Goldman Sachs Japan Co., Ltd. is a Financial Instrument Dealer registered with the Kanto Financial Bureau under registration number Kinsho 69, and a member of Japan Securities Dealers Association, Financial Futures Association of Japan and Type II Financial Instruments Firms Association. Sales and purchase of equities are subject to commission pre-determined with clients plus consumption tax. See company-specific disclosures as to any applicable disclosures required by Japanese stock exchanges, the Japanese Securities Dealers Association or the Japanese Securities Finance Company.

Ratings, coverage groups and views and related definitions

Buy (B), Neutral (N), Sell (S) -Analysts recommend stocks as Buys or Sells for inclusion on various regional Investment Lists. Being assigned a Buy or Sell on an Investment List is determined by a stock's return potential relative to its coverage group as described below. Any stock not assigned as a Buy or a Sell on an Investment List is deemed Neutral. Each regional Investment Review Committee manages various regional Investment Lists to a global guideline of 25%-35% of stocks as Buy and 10%-15% of stocks as Sell; however, the distribution of Buys and Sells in any particular coverage group may vary as determined by the regional Investment Review Committee. Regional Conviction Buy and Sell lists represent investment recommendations focused on either the size of the potential return or the likelihood of the realization of the return.

Return potential represents the price differential between the current share price and the price target expected during the time horizon associated with the price target. Price targets are required for all covered stocks. The return potential, price target and associated time horizon are stated in each report adding or reiterating an Investment List membership.

Coverage groups and views: A list of all stocks in each coverage group is available by primary analyst, stock and coverage group at http://www.gs.com/research/hedge.html. The analyst assigns one of the following coverage views which represents the analyst's investment outlook on the coverage group relative to the group's historical fundamentals and/or valuation. **Attractive (A).** The investment outlook over the following 12 months is favorable relative to the coverage group's historical fundamentals and/or valuation. **Neutral (N).** The investment outlook over the following 12 months is neutral relative to the coverage group's historical fundamentals and/or valuation. **Cautious (C).** The investment outlook over the following 12 months is unfavorable relative to the coverage group's historical fundamentals and/or valuation.

Not Rated (NR). The investment rating and target price have been removed pursuant to Goldman Sachs policy when Goldman Sachs is acting in an advisory capacity in a merger or strategic transaction involving this company and in certain other circumstances. **Rating Suspended (RS).** Goldman Sachs Research has suspended the investment rating and price target for this stock, because there is not a sufficient fundamental basis for determining, or there are legal, regulatory or policy constraints around publishing, an investment rating or target. The previous investment rating and price target, if any, are no longer in effect for this stock and should not be relied upon. **Coverage Suspended (CS).** Goldman Sachs has suspended coverage of this company. **Not Covered (NC).** Goldman Sachs does not cover this company. **Not Available or Not Applicable (NA).** The information is not available for display or is not applicable. **Not Meaningful (NM).** The information is not meaningful and is therefore excluded.

Global product; distributing entities

The Global Investment Research Division of Goldman Sachs produces and distributes research products for clients of Goldman Sachs on a global basis. Analysts based in Goldman Sachs offices around the world produce equity research on industries and companies, and research on macroeconomics, currencies, commodities and portfolio strategy. This research is disseminated in Australia by Goldman Sachs Australia Pty Ltd (ABN 21 006 797 897); in Brazil by Goldman Sachs do Brasil Corretora de Títulos e Valores Mobiliários S.A.; in Canada by either Goldman Sachs Canada Inc. or Goldman, Sachs & Co.; in Hong Kong by Goldman Sachs (Asia) L.L.C.; in India by Goldman Sachs (India) Securities Private Ltd.; in Japan by Goldman Sachs Japan Co., Ltd.; in the Republic of Korea by Goldman Sachs (Asia) L.L.C., Seoul Branch; in New Zealand by Goldman Sachs New Zealand Limited; in Russia by OOO Goldman Sachs; in Singapore by Goldman Sachs (Singapore) Pte. (Company Number: 198602165W); and in the United States of America by Goldman, Sachs & Co. Goldman Sachs International has approved this research in connection with its distribution in the United Kingdom and European Union.

European Union: Goldman Sachs International authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority, has approved this research in connection with its distribution in the European Union and United Kingdom; Goldman Sachs AG and Goldman Sachs International Zweigniederlassung Frankfurt, regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht, may also distribute research in Germany.

General disclosures

This research is for our clients only. Other than disclosures relating to Goldman Sachs, this research is based on current public information that we consider reliable, but we do not represent it is accurate or complete, and it should not be relied on as such. We seek to update our research as appropriate, but various regulations may prevent us from doing so. Other than certain industry reports published on a periodic basis, the large majority of reports are published at irregular intervals as appropriate in the analyst's judgment.

Goldman Sachs conducts a global full-service, integrated investment banking, investment management, and brokerage business. We have investment banking and other business relationships with a substantial percentage of the companies covered by our Global Investment Research Division. Goldman, Sachs & Co., the United States broker dealer, is a member of SIPC (http://www.sipc.org).

Our salespeople, traders, and other professionals may provide oral or written market commentary or trading strategies to our clients and our proprietary trading desks that reflect opinions that are contrary to the opinions expressed in this research. Our asset management area, our proprietary trading desks and investing businesses may make investment decisions that are inconsistent with the recommendations or views expressed in this research.

The analysts named in this report may have from time to time discussed with our clients, including Goldman Sachs salespersons and traders, or may discuss in this report, trading strategies that reference catalysts or events that may have a near-term impact on the market price of the equity securities discussed in this report, which impact may be directionally counter to the analyst's published price target expectations for such stocks. Any such trading strategies are distinct from and do not affect the analyst's fundamental equity rating for such stocks, which rating reflects a stock's return potential relative to its coverage group as described herein.

We and our affiliates, officers, directors, and employees, excluding equity and credit analysts, will from time to time have long or short positions in, act as principal in, and buy or sell, the securities or derivatives, if any, referred to in this research.

The views attributed to third party presenters at Goldman Sachs arranged conferences, including individuals from other parts of Goldman Sachs, do not necessarily reflect those of Global Investment Research and are not an official view of Goldman Sachs.

Any third party referenced herein, including any salespeople, traders and other professionals or members of their household, may have positions in the products mentioned that are inconsistent with the views expressed by analysts named in this report.

This research is not an offer to sell or the solicitation of an offer to buy any security in any jurisdiction where such an offer or solicitation would be illegal. It does not constitute a personal recommendation or take into account the particular investment objectives, financial situations, or needs of individual clients. Clients should consider whether any advice or recommendation in this research is suitable for their particular circumstances and, if appropriate, seek professional advice, including tax advice. The price and value of investments referred to in this research and the income from them may fluctuate. Past performance is not a guide to future performance, future returns are not guaranteed, and a loss of original capital may occur. Fluctuations in exchange rates could have adverse effects on the value or price of, or income derived from, certain investments.

Certain transactions, including those involving futures, options, and other derivatives, give rise to substantial risk and are not suitable for all investors. Investors should review current options disclosure documents which are available from Goldman Sachs sales representatives or at http://www.theocc.com/about/publications/character-risks.jsp. Transaction costs may be significant in option strategies calling for multiple purchase and sales of options such as spreads. Supporting documentation will be supplied upon request.

All research reports are disseminated and available to all clients simultaneously through electronic publication to our internal client websites. Not all research content is redistributed to our clients or available to third-party aggregators, nor is Goldman Sachs responsible for the redistribution of our research by third party aggregators. For research, models or other data available on a particular security, please contact your sales representative or go to http://360.gs.com.

Disclosure information is also available at http://www.gs.com/research/hedge.html or from Research Compliance, 200 West Street, New York, NY 10282.